

## Low Pressure Drop Oxygen Flow Meter for the PLSS, Phase I

Completed Technology Project (2018 - 2019)

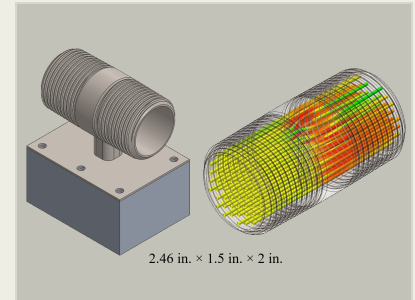


## Project Introduction

The portable life support system (PLSS) of the advanced extravehicular mobility unit (AEMU) provides the necessary environment for a crew member to operate within the space suit. Within the PLSS, the oxygen ventilation loop provides carbon dioxide washout, gas temperature control, humidity control, and trace contaminant removal. Historically, there have been issues with the measurement of air flow for the oxygen ventilation loop. With the Apollo EMU, there were humidity issues with the implemented flow meter. For the Space Shuttle/ISS EMU, the flow sensor was a flapper/microswitch combination that only measured a discrete threshold for flow. This proposal provides an analog method to measure the continuous air flow. This new method meets the low pressure drop requirement and allows operation beyond low earth orbit (LEO) with radiation tolerant electronics. Per the solicitation, a prototype will be developed during phase I to verify this new technology.

## Anticipated Benefits

- ECLSS O2 Flow Meter
- GOX Flow Meter for Thruster
- Crop Production for Crew Food
- Science Investigation
- Other Space Suit O2 Flow Meter
- GOX Flow Meter for Satellite Thrusters
- Medical Research (e.g. NIH)
- Commercial Space ECLSS & Space Suit
- Gas Flow Manufacturers



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## Table of Contents

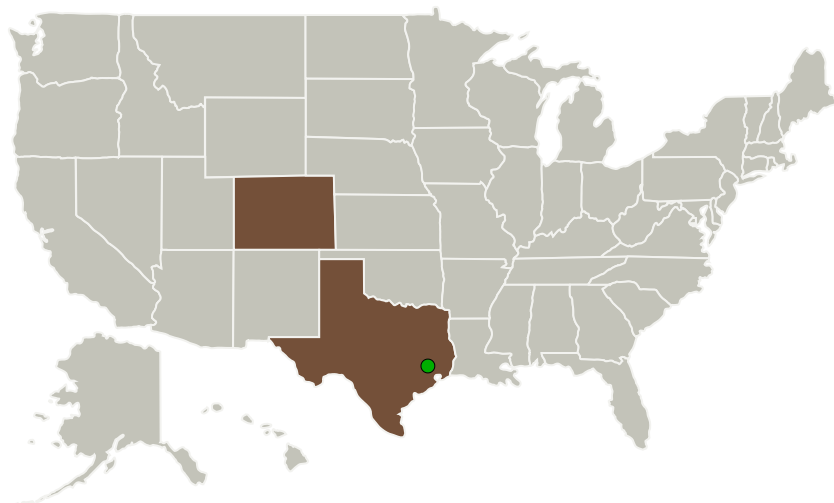
Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	2
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Images	3
Technology Areas	3
Target Destinations	3

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## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Space Lab Technologies, LLC	Lead Organization	Industry Small Disadvantaged Business (SDB)	Pinecliffe, Colorado
● Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

## Primary U.S. Work Locations

Colorado	Texas
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## Project Transitions

▶ **July 2018:** Project Start

✓ **February 2019:** Closed out

## Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/141159>)

## Organizational Responsibility

## Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

## Lead Organization:

Space Lab Technologies, LLC

## Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

## Program Director:

Jason L Kessler

## Program Manager:

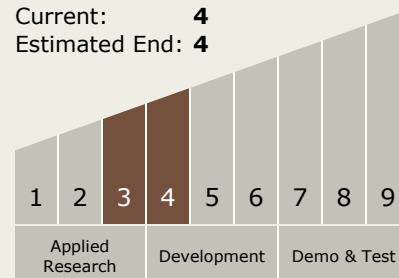
Carlos Torrez

## Principal Investigator:

Adam Escobar

## Technology Maturity (TRL)

Start: **3**  
Current: **4**  
Estimated End: **4**

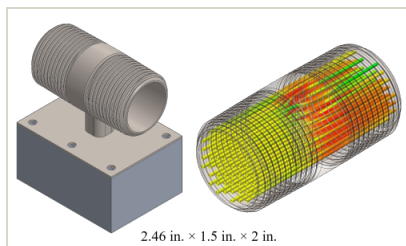


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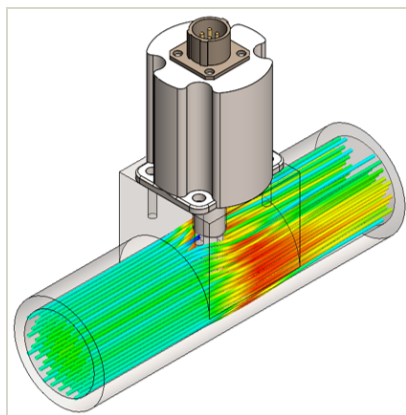


### Images



#### Briefing Chart Image

Low Pressure Drop Oxygen Flow Meter for the PLSS, Phase I  
(<https://techport.nasa.gov/image/130422>)



#### Final Summary Chart Image

Low Pressure Drop Oxygen Flow Meter for the PLSS, Phase I  
(<https://techport.nasa.gov/image/131128>)

### Technology Areas

#### Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - └ TX06.2 Extravehicular Activity Systems
    - └ TX06.2.2 Portable Life Support System

### Target Destinations

Earth, The Moon, Mars